

## ATTACHMENT 2

### Estimate of Water Availability to Accompany Water Right Application of Foothills Property Owners Association

California Water Code Section 1260(k) requires that every application for a permit to appropriate water shall include "sufficient information to demonstrate a reasonable likelihood that unappropriated water is available for the proposed appropriation." This narrative and accompanying calculations provide the required information.

The subject Application includes a point of diversion (POD #1) on an unnamed stream tributary to Mill Creek thence Mark West Creek thence the Russian River in Sonoma County (see attached map). According to State Water Resources Control Board Order WR 98-08, the Mark West Creek watershed is fully appropriated from May 1 to October 31 (upstream of the Highway 101 crossing). The Application proposes a diversion season of November 1 to April 30, which conforms to Order WR 98-08. The following describes the methodology used to demonstrate a *reasonable* likelihood that water is physically available for the proposed appropriation.

The attached map shows the proposed point of diversion and the watershed area tributary thereto. The map also shows lines of equal mean annual runoff as shown on the map included with the document entitled *Mean Annual Runoff in the San Francisco Bay Region, California, 1931-70 by S.E. Rantz, 1974*.<sup>1</sup> An excerpt of this map is attached (Rantz map).

The weighted mean annual runoff for the watershed tributary to POD #1 was computed based on the Rantz map. Mean *seasonal* runoff for the subject watershed was estimated by adjusting the mean *annual* runoff assuming that the ratio of seasonal to annual runoff is identical to the ratio of seasonal to annual mean precipitation. The Santa Rosa precipitation station was used for this purpose (record attached). The resulting seasonal runoff value was adjusted by deducting the *face value* of any senior water rights in the watershed above the proposed points of diversion.

Calculations for the foregoing methodology are attached. These calculations show that in an average water year, approximately 48.4 acre-feet would accrue to POD #1. This would be adequate to fill the 45.8 acre-foot reservoir at POD #1 with 2.6 acre-feet of runoff remaining. Accordingly, it is reasonable to conclude that water is available for the subject Application.

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<sup>1</sup> USGS Miscellaneous Field Studies Map MF-613, prepared in cooperation with the California Department of Water Resources.

**Water Right Application  
by Foothills Property Owners Association  
Estimate of Water Availability**

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**Monthly Precipitation<sup>(1)</sup>**

**SANTA ROSA, CALIFORNIA**

<b>Month</b>	<b>Mean Precipitation (in)</b>
October	1.55
November	3.67
December	5.5
January	6.22
February	5.33
March	4.09
April	2.04
May	0.95
June	0.26
July	0.03
August	0.08
September	0.39
<b>Annual</b>	<b>30.11</b>

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**Point of Diversion #1**

Mean Precipitation for requested diversion season (11/1 - 4/30):	26.85 in
Precipitation during requested diversion season as a percentage of total precipitation:	89.17%
Mean Annual Runoff: <sup>(2)</sup>	18.0 in
Estimated Mean Seasonal Runoff: <sup>(3)</sup>	16.1 in
Watershed Area for POD #1:	36.1 ac
Total Estimated Mean Seasonal Runoff at POD #1:	48.4 ac-ft
Senior Diverters of Record within POD #1 watershed (face value):	0.0 ac-ft
Total water available at POD #1:	48.4 ac-ft
Requested diversion amount:	45.8 ac-ft
Total Seasonal Amount Remaining in Stream After Diversion:	2.6 ac-ft

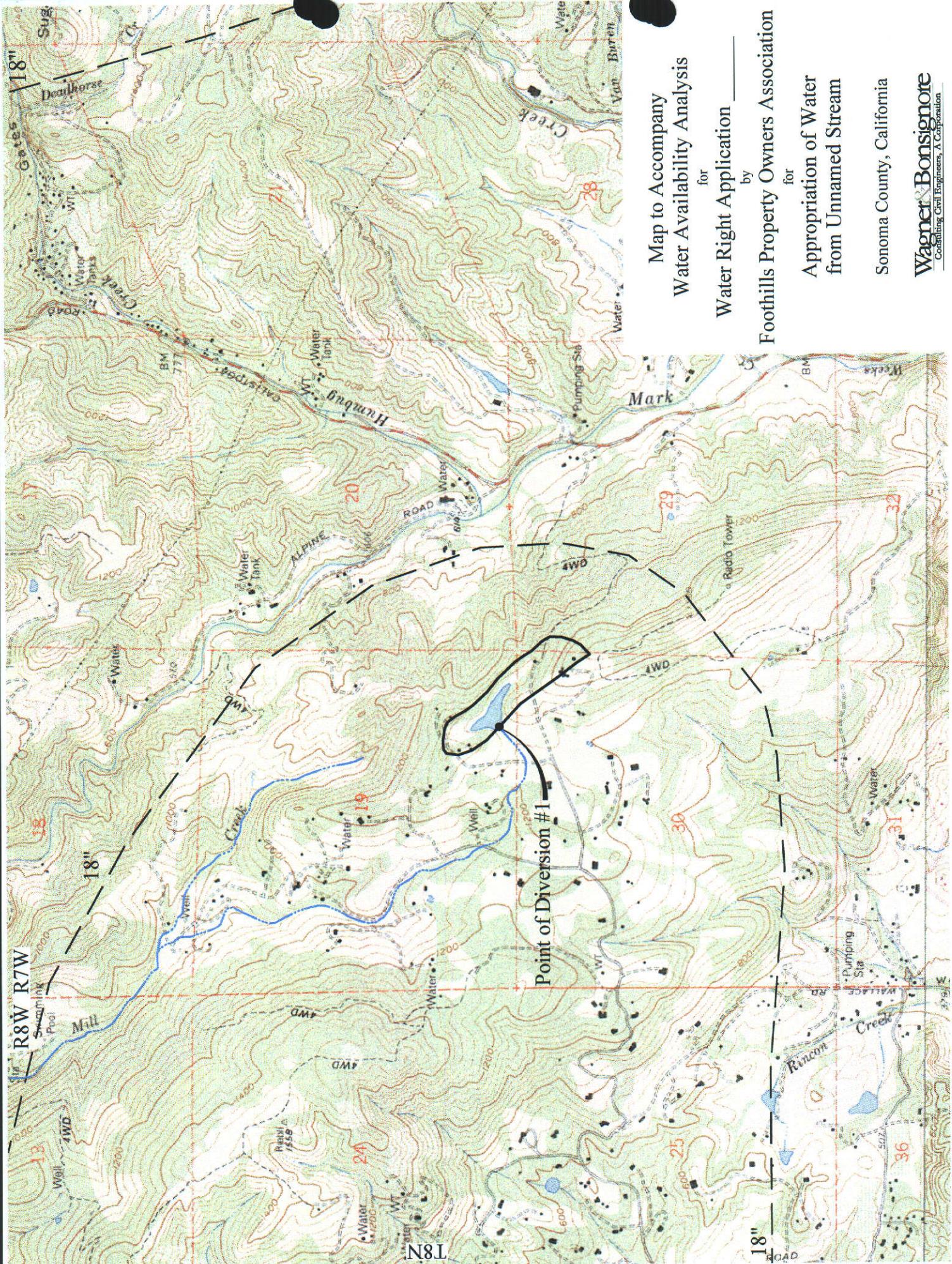
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**Notes:**

<sup>(1)</sup> Source: Western Regional Climate Center website, <http://www.wrcc.dri.edu/summary/climsmca.html>

<sup>(2)</sup> *Mean Annual Runoff in the San Francisco Bay Region, California, 1931-70 (Miscellaneous Field Studies Map MF-613)*, by S.E. Rantz, 1974.

<sup>(3)</sup> Estimated mean seasonal runoff is computed by multiplying mean annual runoff by percent seasonal precipitation.



Map to Accompany  
Water Availability Analysis  
for  
Water Right Application  
by  
Foothills Property Owners Association  
for  
Appropriation of Water  
from Unnamed Stream

Sonoma County, California

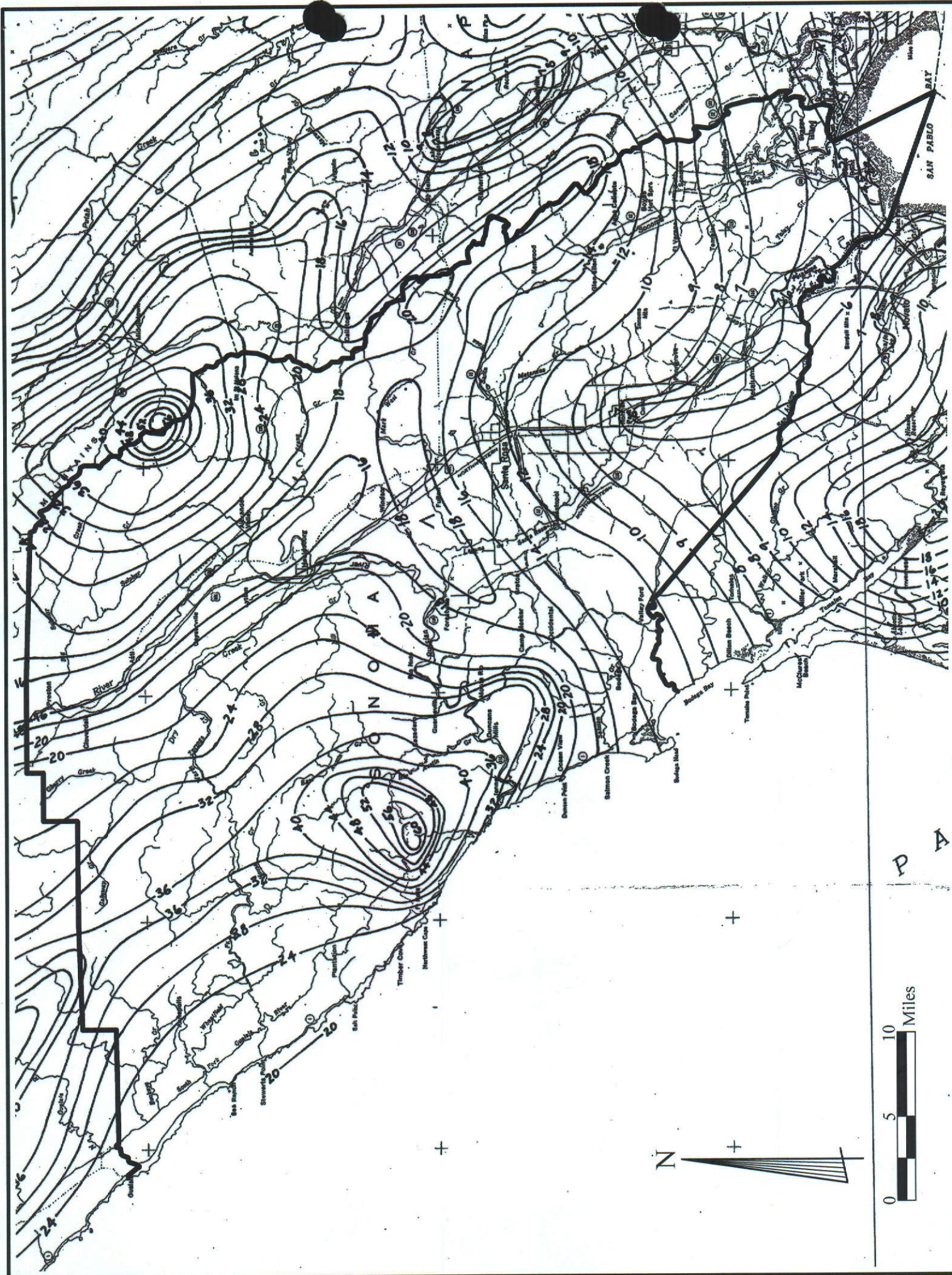
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Engineering Civil Engineers, A Corporation

September 2009

Q:\\Drawings\\Foothill HOA\\Preliminary WAA Map.dwg

MF-6(3)

Mean Annual Runoff in the San Francisco Bay Region, California, 1931-70 (Miscellaneous Field Studies Map MF-6(3)), by S.E. Rantz, 1974.



**Foothills Property Owners Association**  
**Calculation of Weighted Mean Annual Runoff in POD Watersheds**

Watershed	Area (ac)	Mean Annual Runoff (in)	Volume (ac-in)	Volume (ac-ft)
POD #1	<u>36</u>	18	<u>649</u>	<u>54</u>
Total	36		649	54
<u>Weighted Average</u>		<u>18.0</u>		

Notes:

1. Weighted mean annual runoff from automatic calculation using AutoCAD.

# SANTA ROSA, CALIFORNIA

## Monthly Total Precipitation (inches)

<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7965>

-47965

File last updated on Jul 29, \_Ang

\*\*\* Note \*\*\* Provisional Data \*\*\* After Year/Month 200903

a = 1 day missing, b = 2 days missing, c = 3 days, ..etc.,

z = 26 or more days missing, A = Accumulations present

Long-term means based on columns; thus, the monthly row may not

sum (or average) to the long-term annual value.

MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5

Individual Months not used for annual or monthly statistics if more than 5 days are missing.

Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1902	0 z	0 z	0 z	0 z	0 z	0	0 z	0	0	3.72 r	5.02 s	3.93 o	0
1903	6.38	2.58	6.49	0.6	0	0.03	0	0	0	0.64	9.65	3.59	29.96
1904	1.77	12.23	12.93	2.99	0.24	0.07	0	0	4.39	4.6	2.74	4.5	46.46
1905	5.53	4.26	5.59	1.45	2.93	0	0	0	0	0	1.97	1.81 v	21.73
1906	10.95	5.24	0 z	0.72	3.31	1.23	0	0 z	0.16	0	1.88	6.79	30.28
1907	7.27 h	5.17	10.61 l	0.34	0.32	1	0	0	0.46	0.87	0.13	6.46 j	8.29
1908	5.51 k	2.39 u	1.45	0.3	0.59 w	0.08	0.02	0	0	1.37	2.12	4	9.34
1909	18.45	8.74	3.22 r	0	0	0.07	0	0	1.29	1.73	3.35 u	7.61	37.89
1910	4.94	3.75	4.17	0.85	0.08	0.05	0	0	0.01 z	0.68	1.7 t	1.68	16.2
1911	14.2	2.75	4.96	3.04	0.44	0.02	0	0	0	0.58	0.72	2.41	29.12
1912	3.39	1.09	4.69	1.54	2.88	1.14	0	0	2.99	1.47	5.11	1.78	26.08
1913	6.11	0.58	2.73	1.91	1.28	0.05	0.07	0	0	0	7.5	8.9 u	20.23
1914	14	0 z	0 z	0 z	0.95	0.41	0 z	0 z	0.07	1.91	1.3	7.23	25.87
1915	9.08	13.52	3.98	0.65	4.82	0 z	0 z	0	0 z	0.2	1.71	6.04 u	33.96
1916	15.22 h	3.53	1.89	0 z	0.65	0.06	0.61	0.32	0	1.17	2.68	5.92 s	10.91
1917	0 z	5.15 q	1.22 z	2.52 w	0.14	0.02	0 z	0	0.33 z	0	1.49	2.25	3.9
1918	1.43	7.06	4.73	0.86	0.03 z	0 z	0 z	0.03 z	2.52 x	1.04	3.96	2.55 x	19.08
1919	5.59 u	8.52 l	2.3 v	0.5 y	0.2 z	0 z	0 z	0 z	0.58	0.25 z	0.3 z	4.35	4.93
1920	0.4 z	1.35 w	3.06 t	2.46 x	0 z	0.5 z	0.06 z	0 z	0.1	3 y	7.78 p	8.65	8.75
1921	9.6 q	1.83	5.26 t	1.47 y	1.19 y	0 z	0 z	0 z	0.15 z	0.63	2.03 x	8.78 p	2.46
1922	1.1 y	6.81 l	3.46 s	0.25 z	0.52	0.06 z	0 z	0 z	0 z	2.79 w	4.92	10.84 p	5.44
1923	2.27 v	1.14 z	0.05 z	5.24	0.22 a	0.44	0 z	0.22 z	1.78	0.5	0.48 a	1.25	9.91
1924	4.5	5.58 v	0.83	0.43	0.33	0.01	0.01	0.01	0.01	4.34	2.35 s	7.02 t	10.47
1925	1.88	14.42	3.93	1.77	5.11	0.01	0.07	0.01	1.17	0.19	3.53	1.53	33.62
1926	8.84	6.88	0.25	9.58	0.4	0	0.02	0.03	0.02	1.37	12.64	2.83	42.86
1927	6.82	11.03 e	3.47 a	3.47	0.43	0.4	0.01	0.01	0.01	1.98	7.48	3.24 t	35.11
1928	3.1	3.52	6.96	1.97	0.18	0	0	0	0	0.34	4.28	3.21 x	20.35
1929	1.48	2.1	2.1	1.3	0.13	2.43 y	0	0	0	0.04	0	12.47	19.62
1930	5.4	3.91	2.53	1.53	0.62	0	0	0	0.44	0.87	1.4	0.62	17.32
1931	3.48 e	1.87	2.94	0.49	0.9	0.67	0	0	0	1.4	2.27	11.29	25.31
1932	3.45	1.49	1.21	1.43	1.65	0	0	0	0	0.08	1.69	4.06	15.06
1933	6.4	1.51	4.64	0.12	2.23	0	0.02	0	0.17	2.02	0	8.14	25.25
1934	1.75	4.69	1.13	0.73	1.39	1	0	0	0.03	2.28	5.19	3.45	21.64
1935	7.36	3.5	6.31	6.87	0	0	0	0.12	0.23	1.02	1.47	2.95 a	29.83
1936	7.77	11.81	1.58	1.86	0.61	0.8	0	0.03	0	0.22	0.02	2.9	27.6
1937	4.92	8.59	6.31	1.87	0.19	1.28	0.05	0	0	1.06	7.46 a	5.4	37.13
1938	4.77	9.66	8.03	2.45	0.06	0	0.02	0	0.38	2.18	2.22	2.14	31.91
1939	3.36	1.61	2.41	0.14	1.12	0	0	0	0.08	0.52	0.46	2.88	12.58
1940	10.87	12.31	7.14	1.84	1.96	0.07	0	0	0.5	1.82	2.59	13.56	52.66
1941	11.02	8.22	5.59	6.71	1.84	0.3	0	0	0.13	1.53	3.58	9.12	48.04
1942	6.5	8.65	3.78	5.58	1.67	0	0.02	0	0.15	1.23	5.75	5.8	39.13
1943	9.28	2.73	4.85	2.67	0.05	0	0.03	0	0	0.68	1.16	2.38	23.83
1944	5.07	7.66	2.25	2.15	1.58	0.28	0	0	0.02	2.45	5.9	4.22	31.58
1945	3.13	4.92	5.82	0.33	1.39	0	0	0	0	2.91	4.23	10.37	33.1
1946	2.32	2.98	2.2	0.1	0.47	0	0.2	0	0.06	0.28	4.08	3.66	16.35
1947	0.76	3.82	4.94	0.65	0.4	1.63	0	0	0	5.28	1.55	1.22	20.25
1948	4.18	1.51	5.57	7.61	1.03	0.25	0.06	0	0.13	0.85	1.87	4.67	27.73
1949	1.39	3.32	6.83	0.08	0.74	0	0.05	0.04	0.02	0.02	2.12	2.79	17.4
1950	10.12	5.15	3.29	1.31	0.56	0.06	0	0	0	3.46	7.19	9.38	40.52
1951	5.14	2.84	1.25	1.27	1.48	0	0	0.01	0.04	2.68	6.26	8.01	28.98
1952	10.19	2.88	4.62	0.84	0.57	1.38	0.04	0	0.05	0.08	2.73	14.72	38.1
1953	6.74	0.08	3.17	3.91	0.57	0.97	0	0.17	0	1.31	4.15 j	0.96	17.88
1954	7.8	3.19	5.74	3.23	0.37	0.26	0	1.35	0	0.9	5.64	4.43	32.91

1955	3.63	1.22	0.6	3.68	0.01	0	0	0	0.45	0.51	3.28	17.89	31.27		
1956	11.78	6.15	0.31	2.48	1.28	0.1	0	0	0.17	2.28	0.23	0.38	25.16		
1957	3.85	5.57	2.49	2.32	3.93	0.08	0	0	2.16	6.16	0.93	3.99	31.48		
1958	7.18	11.94	6.87	5.43	0.45	0.44	0.01	0.01	0.03	0.15	0.29	1.96	34.76		
1959	7.75	6.24	1.6	0.25	0.16	0	0	0	3.16	0.14	0.08	1.8	21.18		
1960	5.65	8.46	6.05	1.38	0.8	0 a	0	0	0.01	0.71 d	3.81	4.5	31.37		
1961	5.22	3.29	4.6	1.07	0.77	0.16	0	0.03	0.57	0.17	2.88	3.93 c	22.69		
1962	2.02	8.79	4.34	0.51 a	0.06	0	0	0.08	0.36	9.47	0.95	4.64	31.22		
1963	3.75	4.22	4.94	6.57	0.66	0	0	0.01	0.09	2.61	7.53	0.81	31.19		
1964	5.19	0.33	1.97	0.33	0.4	1.1	0	0.02	0	2.31	6.12	8.64	26.41		
1965	6.63	1.24	0.97	5.04	0	0	0.01	0.5	0 z	0.23	6.11	3.74	24.47		
1966	8.62	3.3	0.97	1.31	0.21	0.13	0	0.12	0.35	0.01	7.61	6.55	29.18		
1967	12.42	0.58	5.86	6.72	0.17	1.94	0	0	0.07	0.86	2.68	4.01	35.31		
1968	7.63	4.82	4.2	0.48	0.26	0	0	1.68	0.02	2.07	3.39	9.09	33.64		
1969	13.25	8.23	1.79	3.23	0.03	0.04	0	0	0.03	2.42	1.19	11.79	42		
1970	15.89	3.17	3.44	0.07	0	0.44	0	0	0	2.24	8.97	10.78	45		
1971	3.13	0.19	4.05	1.22	0.24	0.05	0	0.03	0.34	0.49	2.39	5.49	17.62		
1972	1.89	3.49	1.02	1.79	0.09	0.13	0.05	0.11	0.66	3.47	6.87	5.12	24.69		
1973	15.38	7.17	3.48	0.65	0.03	0	0	0	0.74	2.37	13.23	5.33	48.38		
1974	6.48	3.54	6.67	2.87	0.09	0	1.61	0	0	1.27	1.2	3.8	27.53		
1975	1.98	9.88	7.84	1.71	0.02	0.1	0	0.21	0.02	6.44	1.58	0.89	30.67		
1976	0.39	2.61	0.92	2.62	0	0.03	0	0.78	0.66	0.46	1.76	1.15	11.38		
1977	2.01	1.93	2.65	0.23	1.43	0	0	0	1.16	0.65	0.03	5.22	15.31		
1978	9.81	2.44 d	0 z	2.29	0.08	0	0	0	1.38	0	0 z	0.41	16.41		
1979	0 z	0 z	0 z	0 z	0 z	0 z	0.01	0	0.09	4.14	5.99	7.71	17.94		
1980	7.09	8.82	1.52	2	0.19	0.27	0	0	0	0.38	0.5	6.6 a	27.37		
1981	7.81	2.6	3.58	0.2	0.63	0	0.02	0	0.24	2.76	8.91	11.29	38.04		
1982	8.72	5.23	6.5	4	0	0.03	0	0	0.97	4.3 a	8.44	3.61	41.8		
1983	8.39	9.83	15.74	3.46	0.92	0	0	0.75	0.24	1.2	11.21	11.33	63.07		
1984	0.65	2.45	2.25	1.18	0.11	0.13	0	0.17	0.09	2.36	10.92	2.6	22.91		
1985	1.87	3.01	4.61	0.2	0.04	0.02	0.03	0	1.18	1.4	4.5	3.72	20.58		
1986	6.64	15.94	5.9	0.83	0.82	0	0	0	2.75	0.55	0.2	2.65	36.28		
1987	5.01	5.45 a	4.83	0.16	0.08	0.01	0.01	0	0	1.37	4.45	6.11 a	27.48		
1988	6.99	0.4	0.02	1.53	0.73	0.49	0	0	0	0.11	4.89	4.07	19.23		
1989	1.47	1.53 a	10.22	1.22	0.13	0.22	0	0.04	2.72	2.65	1.71	0	21.91		
1990	5.74	3.27	2.03	0.24	5.46	0.01	0	0	0.27	0.62	0.44	1.16	19.24		
1991	0.75	4.72	13.74	0.33	0.13	0.72	0	0.05	0.01	1.74	1.15	2.91	26.25		
1992	2.03	9.34	4.69	1.64	0	0.79	0	0	0	3.65	0.31	8.73	31.18		
1993	11.48	5.58 b	3.44	1.6	1.43	1.06	0	0	0	3.06	3.39 a	3.94	34.98		
1994	3.38	4.8	0.34	1.56	0.89	0	0.02	0	0.01	1.02	7.21	3.37 a	22.6		
1995	17.08	1.54	11.52	3.01	1.78	0.76	0	0	0	0	0.41	9.38	45.48		
1996	8.94	9.43	2.58	3.89	3.69	0	0	0	0.05	0.89	3.47	11.83	44.77		
1997	11.4	0.86	1.37	1.28	0.87	0.42	0	1.01	0.46	1.48	7.42	3.29	29.86		
1998	10.7	19.42	3.89	0 z	4.04	0	0	0	0.05	1.06	5.88	1.35	46.39		
1999	5.12	12.37	4.29	2.13	0.13	0.15	0	0	0.17	0.99	3.59	0.7	29.64		
2000	5.44	11.65	3.07	0 z	0 z	0.25	0	0.01	0.54	3.45	1.65	0.86	26.92		
2001	5.27	5.94	0 z	0 z	0 z	0.48	0	0	0.13	0.96	9	11.49	33.27		
2002	5.02	1.84	2.43	0.64	1.13	0	0	0	0	3.48	16.18	30.72			
2003	3.7	2.18	2.81	4.89	1.48	0.05	0.03	0.01	0.07	0.04	3.22	11.42	29.9		
2004	3.44	9.24	1.14	0.68	0.03	0	0.02	0.01	0.11	3.27	1.81	10.46	30.21		
2005	4.12	4.29	5.75	1.61	5.55	0.95 a	0	0.02	0	1	2.47	17.65	43.41		
2006	5.36	3.63	9.97	5.05	0.49	0.02	0.02	0	0	0.57	3.66	5.46	34.23		
2007	0.57	7.1	0.31	2.58	0.36	0	0.17	0	0.05	3.26	0.81	5.06	20.27		
2008	11.21	3.09	0.32	0.3	0.03	0	0	0.03	0.78	2.57	3.26	21.59			
2009	0.63	8.76	2.77	0.49	3.1	0.06 a	0 h	0 z	0 z	0 z	0 z	0 z	15.81		

#### Period of Record Statistics

MEAN	6.22	5.33	4.09	2.04	0.95	0.26	0.03	0.08	0.39	1.55	3.67	5.5	30.29
S.D.	4.03	3.93	2.99	1.96	1.27	0.42	0.18	0.26	0.78	1.6	3.07	4.12	9.75
SKEW	0.81	1.06	1.42	1.52	2.05	1.91	7.99	4.37	3	1.98	1.01	1.03	0.62
MAX	18.45	19.42	15.74	9.58	5.55	1.94	1.61	1.68	4.39	9.47	13.23	17.89	63.07
MIN	0.39	0.08	0.02	0	0	0	0	0	0	0	0	0	11.38
NO YRS	97	98	94	96	99	100	97	99	99	103	98	95	78